

# H A N D B O O K   O F   I N S T R U C T I O N S



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Model 7T Solid State Stereo Console

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## FOREWORD

To obtain maximum performance and enjoyment from your 7T stereo console, please study these instructions carefully. Installing and operating the 7T is not complicated, but the extraordinary flexibility provided by its numerous convenience features may not be fully appreciated unless you spend a little time becoming familiar with its controls and connection facilities.

For your convenience, this manual is divided into two parts. The first part covers installation and operation in a simple, non-technical manner. The second part provides a more detailed description of the features and facilities of your 7T. It has been written to answer the question "What goes on inside?", and to help you in situations where you may wish to use the 7T in special applications. Detailed technical specifications are also included in this part.

For quick identification of the many controls, connection facilities, and adjustments on the 7T stereo console, all references to them in this manual are printed in **bold-face** type. You will notice that the spelling, capitalization, abbreviation, and punctuation of all such markings appear exactly as lettered on the front and rear panels of the instrument.

## AFTER UNPACKING

It will be to your advantage to save all the packing materials—carton, fillers, cushioning, etc. They will prove valuable in preventing damage should you ever have occasion to transport or ship your 7T. Be careful that you do not inadvertently throw away or lose the Parts Kit envelope packed with the unit.

Please inspect your 7T carefully for any signs of damage incurred in transit. It has undergone very strict quality-control inspections and tests prior to packing. Thus it left the factory unmarred, and in perfect operating condition. If you should discover damage, notify the transportation company without delay. Only you, the consignee, may institute a claim with the carrier for damage during shipment. However, the Marantz Company will cooperate fully with you in such an event. Save the carton as evidence of damage for their inspection.

## WARRANTY

To qualify for the Marantz 3-Year Golden Warranty, please fill out the warranty registration card and mail it to the factory promptly. Your dealer has officially reported your ownership of this stereo console and date of delivery to you, but your warranty protection will not go into effect unless you promptly return the registration card, which is packed within the carton.

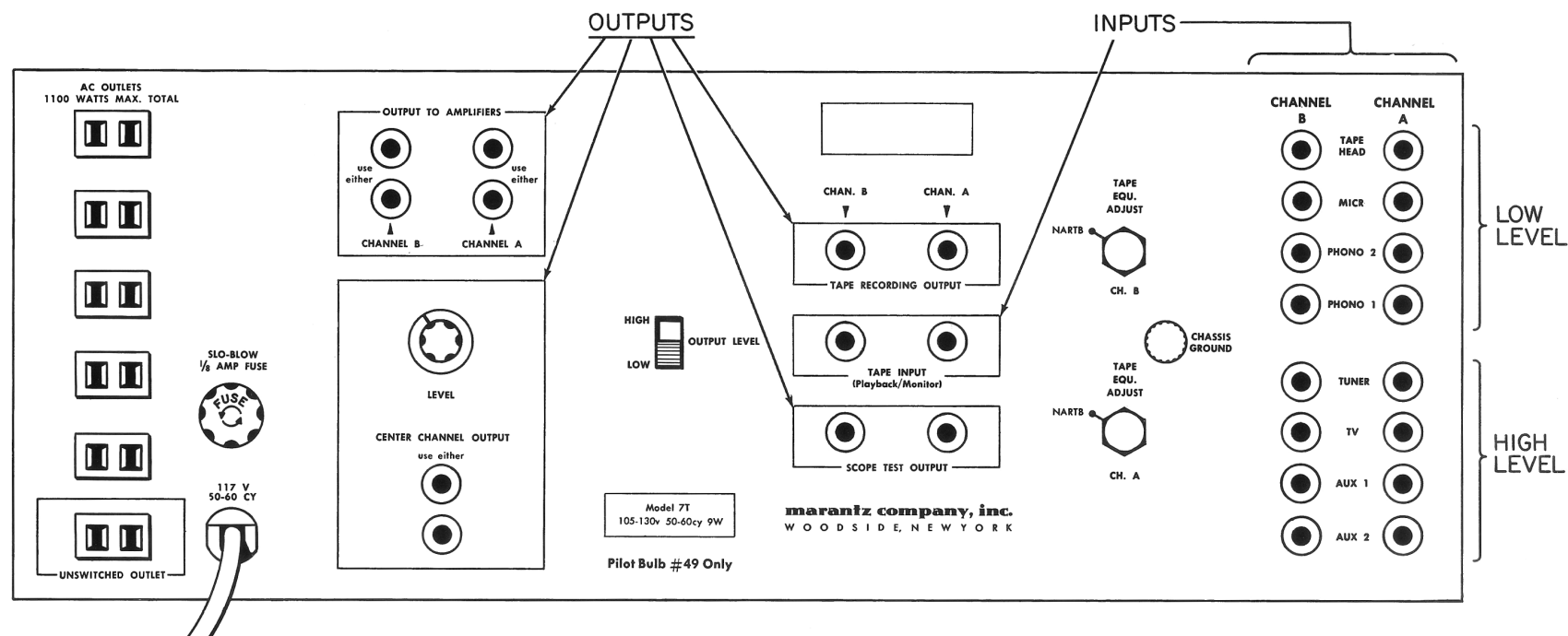


Figure 1. Rear Panel Connection Facilities and Adjustments

## PREPARATION FOR USE

### CABINET INSTALLATION

The Marantz model 7T stereo console can be installed in furniture cabinets and custom-

built panels, or it can be used on an open shelf or table top. An attractive solidly-constructed, oiled-walnut cabinet—the model B7-0—may be ordered from your dealer. Simply slide the 7T into this cabinet from the front and fasten it in place using the four wood screws packed in the Parts Kit envelope. For custom installations, please read the instructions on page 21.

### SIGNAL CONNECTIONS

All signal connections to the 7T should be made with shielded audio cables. Two four-foot audio cables have been supplied with the unit (packed in the Parts Kit envelope). Where longer lengths are needed, suitable standard cables are sold by your dealer.

Figure 1 shows the location of the input and output jacks on the rear panel. These are for "permanent" connections. Use of the front panel jacks will be discussed later. The rear panel signal connections are arranged in stereo pairs (except for the center channel output jacks). Channel A corresponds to the left audio channel; channel B to right audio channel. To avoid confusion, we suggest that you connect one cable at a time between the 7T and the other components of your system. In this way, you will avoid mixing up the channels or mixing up signal sources and destinations.

Notice in Figure 1, that the four pairs of jacks at the top, right corner of the rear panel are for low-level input signals; the bottom four pairs of jacks are for high-level input signals.

**TAPE HEAD jacks** This pair of jacks is intended for use with a tape deck or player which does not have self-contained playback preamplifiers, or a tape player whose performance can be improved by using the 7T instead of the player's preamplifiers. In general, you should follow the manufacturer's recommendations regarding optimum cable capacitance or resistive termination for his equipment. As with record player connections, you can minimize loss of high-frequencies by keeping the connecting cables as short as possible. If hum is noticeable when playing a tape deck through your system, it may be necessary to ground the tape deck, via a separate wire, to the **CHASSIS GROUND** binding post on the 7T.

#### **NOTE**

If the **TAPE HEAD** jacks are to remain un-

used, install two of the small, white shorting plugs which have been packed in the Parts Kit envelope. Since these inputs have very high gain and a high input impedance, you may otherwise hear low-frequency noise when the front panel **selector** switch is turned momentarily to the **TAPE-HEAD** position.

**MICROPHONE jacks** This pair of jacks is intended for use with standard high-impedance microphones. If the microphone has adjustable impedance, it should be set to the highest value. Low impedance microphones can be connected to the 7T directly, but the volume may not be sufficient. In this case use a microphone input transformer to step up the level.

#### **NOTE**

If the **MICR** jacks are to remain unused, install two of the small white shorting plugs which have been packed in the Parts Kit envelope. Since these inputs have very high gain and a high input impedance, you may otherwise hear noise when the front panel **selector** switch is turned momentarily through the **MICROPHONE** position.

**PHONO 1 and PHONO 2 jacks** These jacks are intended for use with standard phono cartridges requiring a 47,000-ohm resistive load.

If hum is heard when playing records, it is evidence of inadequate grounding or shielding of your record player or connections. Try connecting a separate ground wire from the turntable or record changer frame to the **CHASSIS GROUND** binding post on the 7T. If the tone-arm is mounted on a wood panel or is otherwise insulated from the frame,

connect it to the grounding wire with a short jumper. Make the connection to the arm's mounting base. If the two pairs of signal wires in the arm have a single, overall shield, try grounding the shield instead of the arm itself. Keep the two phono connecting cables and the grounding wire closely together. In three-wire (common ground) systems, this will minimize "ground loops".

**TUNER jacks** These high level jacks can be used for connecting a stereo or mono tuner to the 7T. For stereo (multiplex) FM tuners, connect a pair of audio cables between the tuner's A and B or left and right output jacks and the **CHANNEL A** and **CHANNEL B TUNER** jacks on the rear panel. For monophonic FM or AM tuners, only one cable is required. It may be connected to either of the two jacks. If you wish to connect two monophonic tuners to the 7T, you can route one audio cable to the **CHANNEL A TUNER** jack, and the other cable to the **CHANNEL B TUNER** jack. You can select either tuner for listening by using the **mode** switch on the front panel.

**TV jacks** If your television receiver has an audio output jack, you can connect it to either one of the high-level **TV** jacks on the 7T. If no audio output jack is provided, consult with your TV serviceman about the feasibility of wiring a shielded audio cable to the input side of the receiver's volume control or other sound channel circuit point ahead of the output amplifier or speaker. The circuit point chosen should provide between  $\frac{1}{4}$  and 2 volts of audio signal, with no d-c component. If you hear hum or intercarrier buzz when feeding TV sound through your

system, consult your TV serviceman.

**AUX 1 and AUX 2 jacks** These high-level input jacks have been provided for connecting miscellaneous sources such as tape players (with self-contained playback pre-amplifiers), phono cartridges which provide RIAA-equalized high-level output, or additional tuners or receivers, etc.

#### **TAPE RECORDING OUTPUT jacks**

The signals available at this pair of jacks are unaffected by the **balance**, **volume**, **treble**, **bass**, **LOW-FREQ**, and **HIGH-FREQ FILTER** controls on the front panel, or the **LEVEL** adjustment and the **OUTPUT LEVEL** switch on the rear panel. They are, however, controlled by the **mode** switch.

Connecting these jacks to the line or "radio" inputs of your tape recorder permits you to record any program source material. These outputs are also capable of feeding unbalanced 600-ohm lines at a maximum peaking level of + 10 dBm, if required.

#### **TAPE INPUT (Playback/Monitor) jacks**

— As the label implies, this pair of jacks serves two purposes: signals from a tape recorder can be played through your system when the recorder is set for playback mode of operation or, taping quality can be "monitored" when the recorder is set for record mode of operation (assuming, of course, that the recorder is equipped with separate record and playback heads and separate record and playback amplifiers).

Connect a pair of audio cables from the play-

back outputs of your recorder to the **TAPE INPUT** jacks on the 7T. If your recorder does not have these separate facilities, you can, instead, connect the playback outputs to either the **AUX 1** or **AUX 2** jacks, especially if, in certain situations, you wish to use the front panel **mode** switch for playing half-track or single-track monophonic tapes. The input levels and input impedances of the **TAPE INPUT** jacks are the same as the **TUNER**, **TV**, **AUX 1**, and **AUX 2** jacks.

**SCOPE TEST OUTPUT jacks** This pair of jacks has been provided for convenience in testing phase, separation, balance, etc., of program source material, using an oscilloscope. Owners of the Marantz model 10B stereo tuner may take advantage of its built-in oscilloscope tuning indicator by connecting a pair of audio cables from the **SCOPE TEST OUTPUT** jacks on the 7T to the **EXTERNAL SCOPE INPUT** jacks on the tuner. When the tuner's **display** switch is set to **External**, the program source signals chosen by the **selector** or the **TAPE FUNCTIONS** switch on the 7T's front panel will be displayed for technical evaluation. The signals available at the **SCOPE TEST OUTPUT** jacks are unaffected by the **balance**, **volume**, **treble**, **bass**, **LOW-FREQ**, and **HIGH-FREQ FILTER** controls on the front panel, or the **LEVEL** adjustment and the **OUTPUT LEVEL** switch on the rear panel. They are, however, controlled by the **mode** switch.

#### **OUTPUT TO AMPLIFIERS jacks**

Connect a pair of audio cables from one

**CHANNEL A** and one **CHANNEL B** output jack to the correspondingly labelled, or "left" and "right" input jacks on your stereo power amplifier. Notice that each output channel of the 7T has duplicate jacks for feeding additional amplifiers if required.

#### **CENTER CHANNEL OUTPUT jacks**

These jacks may be used with "derived" center channel systems or for remote monophonic loudspeaker applications. Both output channels of the 7T are sampled and mixed to form an A + B (left plus right) monophonic signal which can be fed to an additional external power amplifier. The amplitude of this signal is controlled by the **LEVEL** adjustment on the rear panel of the 7T.

### **POWER CONNECTIONS**

**Line Cord** With the **ON-OFF** switch on the front panel set to **OFF**, plug the line cord into an electrical outlet providing 105 to 130 volts, 50 to 60 cycles **AC ONLY**.

**Convenience Outlets** Six **AC OUTLETS** on the rear panel have been provided for powering associated components of your system, such as power amplifiers, tuners, tape recorders, record players, etc. The top five of these are controlled by the front panel **ON-OFF** switch. The **UNSWITCHED OUTLET** at the bottom of the rear panel is not controlled by the **ON-OFF** switch. This outlet is intended for powering a turntable or record changer which has its own on-off switch.

# OPERATION

## SIMPLIFIED OPERATING PROCEDURE

If you are operating the 7T Stereo Console for the first time, follow these simple directions. Later on, you can take full advantage of the instrument's unusual versatility by learning to use the remaining controls and adjustments.

- Step 1.** Turn the **volume** control all the way to the left (fully counter-clockwise) and set the **balance** control to mid-position (pointer to **Normal**).
- Step 2.** Set the **mode** switch to the **STEREO** position.
- Step 3.** Set all four lever switches to the center position (horizontal).
- Step 4.** Set both pairs of treble and bass controls to the "straight up" position (pointers at center black dots).
- Step 5.** Turn on system power with the **ON-OFF** slide switch. The pilot light at the top center of the panel will glow.
- Step 6.** Select the desired program source by turning the **selector** switch to the appropriate position — unless the desired program source is a recorded tape. In this case, simply place the **TAPE FUNCTIONS** switch in the **TAPE PLAY** position.
- Step 7.** Turn the volume control to provide a comfortable listening volume.

## HOW TO USE THE FRONT PANEL CONTROLS AND JACKS

(See Figure 2.)

**selector switch** As the name implies, this switch selects the program source you wish to hear or record. If you have connected your tape recorder's playback output to the **TAPE INPUT** jacks on the rear panel, as described on page 4, you may select tape listening by placing the **TAPE FUNCTIONS** lever switch in the **TAPE PLAY** position. When recording an FM broadcast, for example, you would set the **selector** switch to **TUNER** in order to feed the signals from the tuner to the line recording inputs of your tape recorder. With the **TAPE FUNCTIONS** lever in the **OUT** position, you would be listening to the program directly from the tuner. With the **TAPE FUNCTIONS** lever in the **TAPE PLAY** position, you would be listening to (monitoring) the "results" of the recording while it is in progress.

In the **TAPE-HEAD** position, NARTB playback equalization is automatically introduced in both A and B channels. This equalization is adjustable. Please refer to page 9 for additional instructions.

In the **MICROPHONE** position, no equalization is introduced.

In the **PHONO 1** or **PHONO 2** positions, precise RIAA equalization is introduced provided the **PHONO EQUALIZER** lever switch is set to the **RIAA** position.

The **TUNER**, **TV**, **AUXILIARY 1** or **AUXILIARY 2** positions, select the program sources

connected to the corresponding input jacks on the rear panel.

**mode switch** The normal setting of this switch is the **STEREO** position. In special situations, it may be useful to use the other positions. In the **Stereo Reverse** position, the A and B or left and right channel inputs are interchanged so that the channel A input feeds the channel B outputs and the channel B input feeds the channel A outputs. Using this position reverses the apparent left-right placement of musical instruments in a stereo program. The choice between **STEREO** and **Stereo Reverse** positions is a matter of listening preference only.

In the **MONO A + B** position, both input channels are equally mixed, and the mixture (a monophonic equivalent of the stereo input signals) is fed to both channel A and channel B outputs. This position is particularly useful for playing monophonic records with a stereo cartridge, because rumble and pinch-effect distortion on the record are effectively suppressed.

In the **Channel A** position, the channel A or left channel input is fed to both channel A and channel B outputs.

In the **Channel B** position, the channel B or right channel input is fed to both channel A and channel B outputs.

**volume control** This high-precision dual control maintains stereo balance within 2 dB at all normal settings. It controls the level of both output channels simultaneously. It has no effect on the recording outputs or the scope test outputs.



**balance control** This wide-range adjustment alters the level of either output channel in situations where it is necessary to correct unbalanced programs sometimes encountered in older stereo recordings, and in some present-day stereo broadcasts. As it is turned away from its **Normal** position, it simultaneously increases the level in one output channel and decreases the level in the other channel.

#### **TAPE FUNCTIONS lever switch**

When this lever is in its normal **OUT** position, the program source being heard or recorded is determined by the setting of the **selector** switch. In the **TAPE PLAY** or **monitor** position, only the program source connected to the **TAPE INPUT** jacks on the rear panel or to the **PLAYBACK** jack on the front panel, is heard. However, the program source indicated by the **selector** switch continues to be fed to the **TAPE RECORDING OUTPUT** jacks on the rear panel and the **RECORD** jack on the front panel. This facility permits you to feed any program source to your tape recorder while you listen to the "results" of the recording as it is in progress. In the **TAPE COPY** position, any program source connected to the **TAPE INPUT** jacks on the rear panel, or to the **PLAYBACK** jack on the front panel, is fed to the amplifier output channels and, in addition, is fed to the **TAPE RECORDING OUTPUT** jacks on the rear panel and the **RECORD** jack on the front panel.

#### **PHONO EQUALIZER lever switch**

All modern disc recordings (mono and stereo) should be played with **RIAA** equalization.

Old LP discs, especially Columbia made prior to 1955, should be played with the **PHONO EQUALIZER** switch set to the **old Col LP** position. Old 78 rpm shellac discs should be played with the switch set to the **old 78** position. The **PHONO EQUALIZER** lever switch controls the equalization for both the **PHONO 1** and **PHONO 2** inputs.

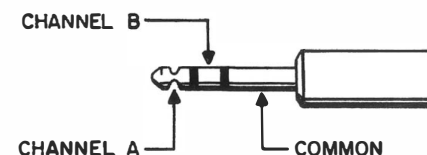
#### **LOW-FREQ FILTER lever switch**

The low frequency filter can be used to sharply reduce turntable rumble, low frequency noises, or "boomy, exaggerated bass. Obviously, use of the filter will reduce the desired low frequency sounds as well as the unwanted noise, therefore, the **100** position should be used only as a "last resort" with troublesome program sources. The loss of bass when using the **50** position will, for most musical material, go unnoticed. In the **OUT** position, the low-frequency filter is switched out of the circuits.

#### **HIGH-FREQ FILTER lever switch**

The high frequency filter can be used to sharply reduce high-frequency noises associated with the playing of poorly recorded tapes or old worn disc recordings. The **9kc** position will usually prove effective in suppressing tape "hiss" or the "scratchy" sound from poor-quality or carelessly handled records. The **5kc** position can be used when playing old shellac 78-rpm records. If an AM tuner is being used with the 7T, the **5kc** position will help considerably by eliminating the 10kc "whistle" effect. In the **OUT** position, the high-frequency filter is switched out of the circuits.

**RECORD jack** This jack is internally connected in parallel with the **TAPE RECORDING OUTPUT** jacks on the rear panel at all times. Thus any signals available at the jacks on the rear panel are simultaneously available at the front panel. You can connect the recording inputs of an external tape recorder to this jack, using a standard 3-conductor phone plug. Plugs of this type have an insulated tip, an insulated ring, and a sleeve which is generally used for common return or ground. The tip of the plug receives the left or A channel of a program, whereas the ring receives the right or B channel.



**PLAYBACK jack** This jack has a built-in switch which automatically disconnects the rear panel **TAPE INPUT** jacks when you insert a standard 3-conductor phone plug. You can connect the playback outputs of an external tape recorder to this jack.

**HEADPHONES jack** This jack is internally connected to the channel A and channel B outputs. When you insert a standard 3-conductor stereo phone plug, the **OUTPUT TO AMPLIFIERS** and the **CENTER CHANNEL OUTPUT** jacks on the rear panel are automatically disconnected. The **HEADPHONES** jack is designed for use with high-impedance as well as low-impedance professional stereo headphones having a rated im-

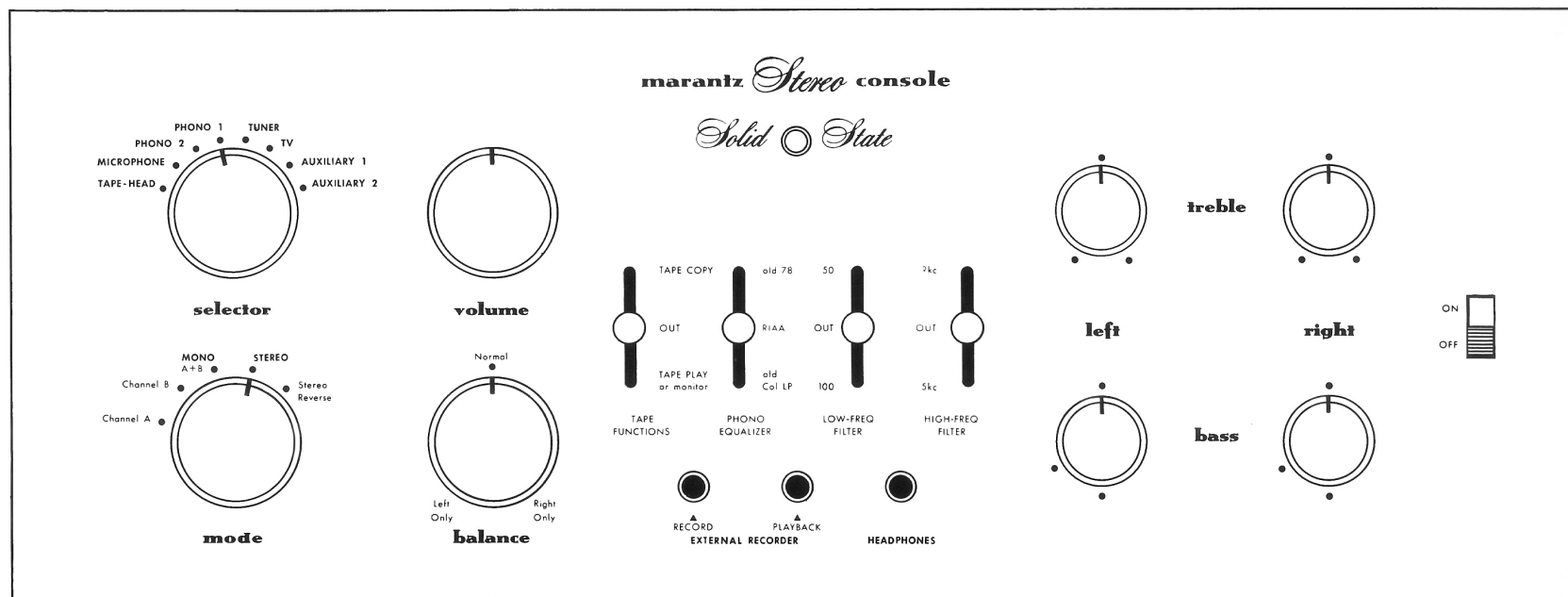


Figure 2. Front Panel Controls and Jacks

pedance of 600 ohms or higher. Two sets of headphones may be used with the aid of a "Y" connection. However, it must be cautioned that a parallel connection of two 600-ohm phones results in a 300-ohm impedance, which will produce a 3-dB loss in level. A series connection will provide more power for this purpose. Higher impedance phones may be easily connected in parallel.

#### NOTE

Although the **HEADPHONES** output does not produce very large output power for driving extremely low-impedance headphones, such as 4, 8, or 16 ohms, no harm will result to the 7T from their use. Such phones were designed specifically for connection to power amplifier speaker terminals.

Remember to turn down the **volume** control before disconnecting the headphones, especially when the level may have been turned up quite high for adequate listening level.

**bass and treble controls** These controls permit you to alter or adjust the tonal balance of program signals to suit your listening preference. Separate controls for each channel make it possible to compensate for unbalanced room acoustics, or for any other tonal imbalance conditions between the channels of stereo program material. The mid-frequency peaks and dips in response characteristic of ordinary continuously-variable "tone" controls have been totally eliminated in the design of the 7T; each control is an eleven-position switch, which provides precise tone compensation and repeatable performance without distortion.

The **treble** controls have five positions of high-frequency boost, five positions of high-

frequency cut, and a center off position (corresponding to the black dot directly above the control. In this position, no treble tone compensation is applied—the frequency response is therefore flat above 1,000 Hz.

The **bass** controls have four positions of low-frequency cut, six positions of low-frequency boost, and a center off position. In this position, no bass tone compensation is applied—the frequency response is therefore flat below 1,000 Hz.

Since the bass boost response curves closely match the difference between the Fletcher-Munson loudness contours, you can use the **bass** controls to maintain tonal balance at low listening levels. In this way, the apparent loudness of musical tones is equalized. Treble boost may be added if desired, but is not required for correct loudness compensation.

### ADJUSTMENTS

**OUTPUT LEVEL** The slide switch on the rear of the 7T (Fig. 3) permits you to change the level of the signals fed to your stereo power amplifier. Normally this switch should be set to the **HIGH** position. If, however, your loudspeakers have unusually high efficiency, or the input sensitivity of your power amplifier is less than 1/2 volt, random electron noise may become audible, despite the exceptionally low noise level of the model 7T. In this case, the **OUTPUT LEVEL** switch should be set to the **LOW** position.

**Center Channel LEVEL** The **LEVEL** adjustment knob on the rear of the 7T controls the level of the mixed A + B, or left plus right monophonic signal which you can feed to a remote amplifier and loudspeaker,

or to a center channel amplifier and loudspeaker. If you set up your system for center channel operation, best listening results will generally be achieved by using an amplifier and loudspeaker similar, if not identical, in performance to those used for the basic left and right channels.

In general, the sound level from the center channel loudspeaker should be not quite as loud as the sound levels from the left and right channel loudspeakers. The optimum setting for the **LEVEL** control can be determined by listening to stereo programs. Remember that this adjustment affects only the relative loudness between the center channel and the main left and right channels. All three channels are controlled by the **volume** control.

**TAPE EQU. ADJUST** These two adjustments have been factory calibrated for precise NARTB (also known as NAB) tape playback equalization with standard playback heads. The adjustments affect the high-frequency response for the heads of tape decks (machines which do not have built-in playback preamplifiers). Compensation can be made for high-frequency loss or exaggeration due to unusually long or short connecting cables between the tape deck and the 7T, use of non-standard heads, head wear, different tape speeds, etc. In most circumstances, satisfactory results can be obtained by adjusting these controls for the best overall tonal balance while listening to the high-frequency sounds of music programs. Simply unscrew the black protective caps and turn the white knobs on each shaft. For precise calibration using a test tape and an audio voltmeter, consult your serviceman.

## SOME SUGGESTIONS ON USING TAPE RECORDERS WITH THE 7T

As you may have gathered from the previous description of the input/output and control facilities of the 7T, there are numerous ways to connect and operate tape recorders with your system. To avoid confusion, in the following discussion, a tape recorder connected to the rear panel facilities of the 7T will be referred to as the “main” recorder; a separate recorder connected to the front panel jacks will be referred to as the “external” recorder. This general arrangement is shown pictorially in Figure 4.

### Recording and Playback

The simplest system tie-in involves only one tape recorder, whose line or “radio” inputs are connected to the **TAPE RECORDING OUTPUT** jacks on the rear panel, and whose playback outputs are connected to the **TAPE INPUT** jacks. An equally simple arrangement using the front panel facilities, involves connecting the line inputs to the **RECORD** jack and the playback outputs to the **PLAYBACK** jack.

**Recording** To make a recording, set the selector switch to the desired program source and put the recorder into the “record” mode of operation. With the **TAPE FUNCTIONS** switch in the **OUT** position, you can listen to the original program source. By placing the **TAPE FUNCTIONS** switch in the **TAPE PLAY** position, you can listen to (monitor) the “results” of the recording while it is in progress. One word of caution — when operating your recorder in the record mode, be careful not to inadvertently place the **TAPE FUNCTIONS** switch in the **TAPE COPY**

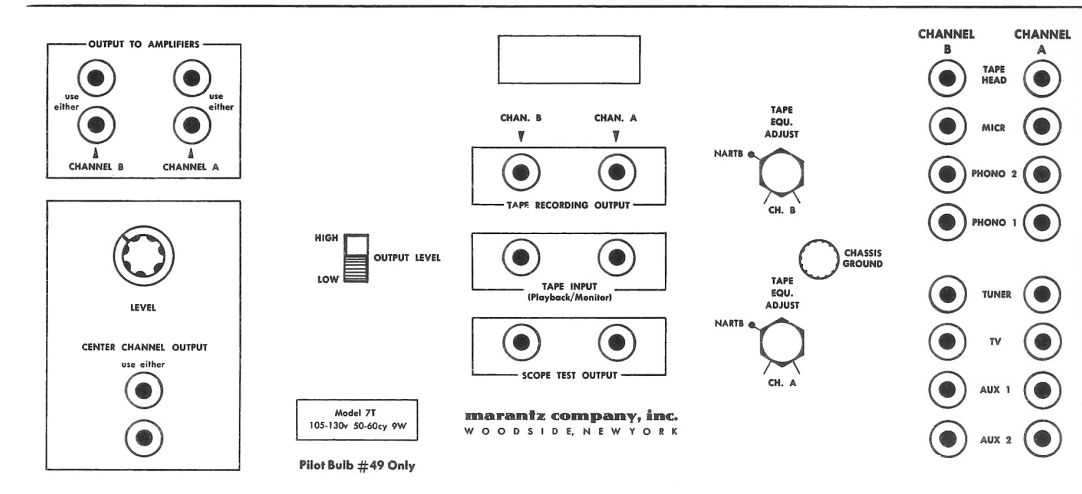


Figure 3. Rear Panel, Partial View

position. Doing this interrupts the selected program source and feeds the recorder’s output signals back to its input terminals, establishing a reverberation loop. If the recorder’s playback level happens to be set higher than

its record level, the resulting echo or howl will rapidly increase in volume level. No harm will be done to the recorder or to the 7T, but the audible effect from your loudspeakers can be unnerving.

**Playback** To listen to a previously made recording, place the **TAPE FUNCTIONS** switch in the **PLAYBACK** position and put the recorder into the “playback” mode of operation. When playing back a tape on the external recorder, the recorder’s playback outputs (plug P2 in Figure 4) should be connected to the **PLAYBACK** jack on the front panel. When playing back a tape on the main recorder, make sure nothing is plugged into the **PLAYBACK** jack, otherwise the main recorder’s playback outputs will be internally disconnected in the 7T.

#### **Making Two Tape Recordings Simultaneously**

You can make two recordings at the same time by connecting two tape recorders to the 7T, as shown in Figure 4. To monitor the external recorder, plug the recorder’s playback output (plug P2) into the **PLAYBACK** jack, and place the **TAPE FUNCTIONS** switch in the **TAPE PLAY** position. To monitor the main recorder, pull plug P2 out of the **PLAYBACK** jack and place the **TAPE FUNCTIONS** switch in the **TAPE PLAY** position.

#### **Recording a Long-duration Program**

With two tape recorders connected to the 7T as shown in Figure 4, you can make a con-

tinuous recording without losing parts of the program during reel changes. For example, with the **selector** switch set to the desired program source, and the **TAPE FUNCTIONS** switch in the **OUT** position, you can start the recording on the main recorder, then prepare the external recorder to begin recording at a convenient program pause before the main recorder is about to run out of tape. As soon as the external recorder is started, you will have ample time to reload the main recorder in preparation for further recording. This process can be repeated indefinitely with both machines. At any time during the recording session, you can monitor the recording by placing the **TAPE FUNCTIONS** switch in the **PLAYBACK** position. Remember: **disconnect** plug P2 from the **PLAYBACK** jack to monitor the **main recorder**; **insert** plug P2 to monitor the **external recorder**.

#### **Making Tape Copies**

Using the input/output and switching facilities of the 7T, and two tape recorders, you can copy and edit tapes from one machine to the other, making improvements, if desired, in tonal balance, noise level, stereo balance, etc.

**Copying and Editing** The general arrangement of equipment for copying and

editing is illustrated in Figure 4. To copy from the main recorder to the external recorder:

- Step 1.** Disconnect plug P2 from the **PLAYBACK** jack.
- Step 2.** Place the **TAPE FUNCTIONS** switch in the **TAPE COPY** position.
- Step 3.** Put the main recorder into the “play” mode and the external recorder into the “record” mode.

To copy from the external recorder to the main recorder:

- Step 1.** Insert plug P2 into the **PLAYBACK** jack.
- Step 2.** Place the **TAPE FUNCTIONS** switch in the **TAPE COPY** position.
- Step 3.** Put the external recorder into the “play” mode and the main recorder into the “record” mode.

To edit (or leave out) program material you do not wish to include in the copy, simply stop the machine that is in the “record” mode, while the unwanted program material is playing. Some machines are equipped with a convenient “pause” control for this purpose.

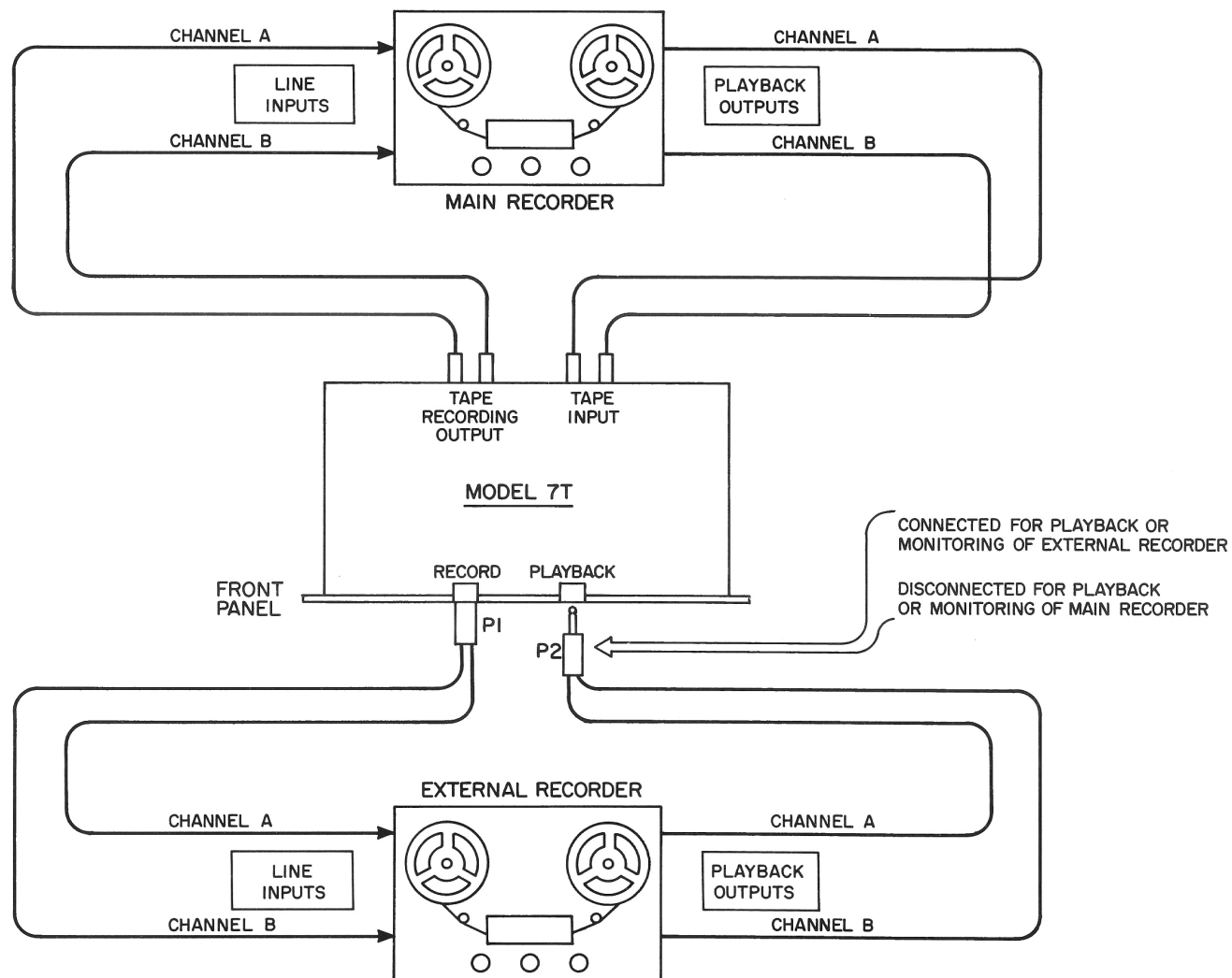


Figure 4. General Arrangement of Two Tape Recorders with Model 7T



**Improving a Tape Copy** To improve the sound of a tape recording, you can copy it (dub) while using the controls of the 7T (**balance**, **treble**, **bass**, **HIGH-FREQ FILTER**, and **LOW-FREQ FILTER** controls. The equipment arrangement for making this type of copy is shown in Figure 5. Notice that in this arrangement, the recording input signals for the main recorder are taken from the duplicate pair of **OUTPUT TO AMPLIFIERS** jacks on the 7T instead of the **TAPE RECORDING OUTPUT** jacks.

#### NOTE

This arrangement can only be used with a main recorder whose recording input sensitivity is sufficient to utilize signals having the same level as those normally fed to your power amplifier. If sufficient gain is not available, we suggest using the **HEADPHONES** jack, as described in the next main paragraph.

The original tape is played on the external recorder; the copy is made on the main recorder. To make the copy:

- Step 1.** Insert plug P2 into the **PLAYBACK** jack.
- Step 2.** Place the **TAPE FUNCTIONS** switch in the **TAPE COPY** position.
- Step 3.** Put the external recorder into the "play" mode and adjust the controls of the 7T for the desired sound quality.
- Step 4.** Put the main recorder into the "record" mode.

To play back the copy after it is rewound:

- Step 1.** Place the **TAPE FUNCTIONS** switch in the **TAPE PLAY** position.
- Step 2.** Disconnect plug P2 from the **PLAYBACK** jack.
- Step 3.** Put the main recorder into the "play" mode.

Remember that the copy tape contains a modification of the sounds on the original tape. Therefore, when playing back the copy, the controls of the 7T should be readjusted for "normal" (unmodified) operation. For example, if the **HIGH-FREQ FILTER** was used during the copying process to reduce high-frequency noise to a satisfactory level, it should be returned to the **OUT** position when playing back the copy tape.

#### Recording from the HEADPHONES jack

Since the signals available at the **HEADPHONES** jack are affected by the tone, filter, **volume**, and **balance** controls, they can be used for making improved tape copies. Using these facilities has the advantage of permitting rapid connection without disturbing cabling at the rear panel, but has the disadvantage of requiring more careful preparation before making the actual copy. Remember that the switches built into the **HEADPHONES** jack automatically disconnect the signals which feed your power amplifier when a plug is inserted in the jack. Thus during the copy process, no sound can be heard from your loudspeakers.

To make a tape copy using the **HEADPHONES** jack, proceed as follows:

- Step 1.** Load the original tape on the main recorder, put the recorder into the "playback" mode, and adjust the 7T's controls for desired tonal balance, channel balance, etc.
- Step 2.** Connect plug P1 of the external recorder to the **HEADPHONES** jack, set the machine for "record" mode, and adjust the **volume** control on the 7T and/or the recording level controls on the external recorder for proper recording level as displayed by the external recorder's recording level indicators.
- Step 3.** Rewind both the original and the trial copy tape. Do not disturb settings of any tone, filter, or level controls.
- Step 4.** Put the external recorder in the "record" mode, and the main recorder in the "playback" mode.

To play back the final copy after it is rewound:

- Step 1.** Disconnect plug P1 from the **HEADPHONES** jack and connect plug P2 to the **PLAYBACK** jack.
- Step 2.** Put the external recorder into the "playback" mode.
- Step 3.** Reset the controls of the 7T for normal (unmodified) operation.

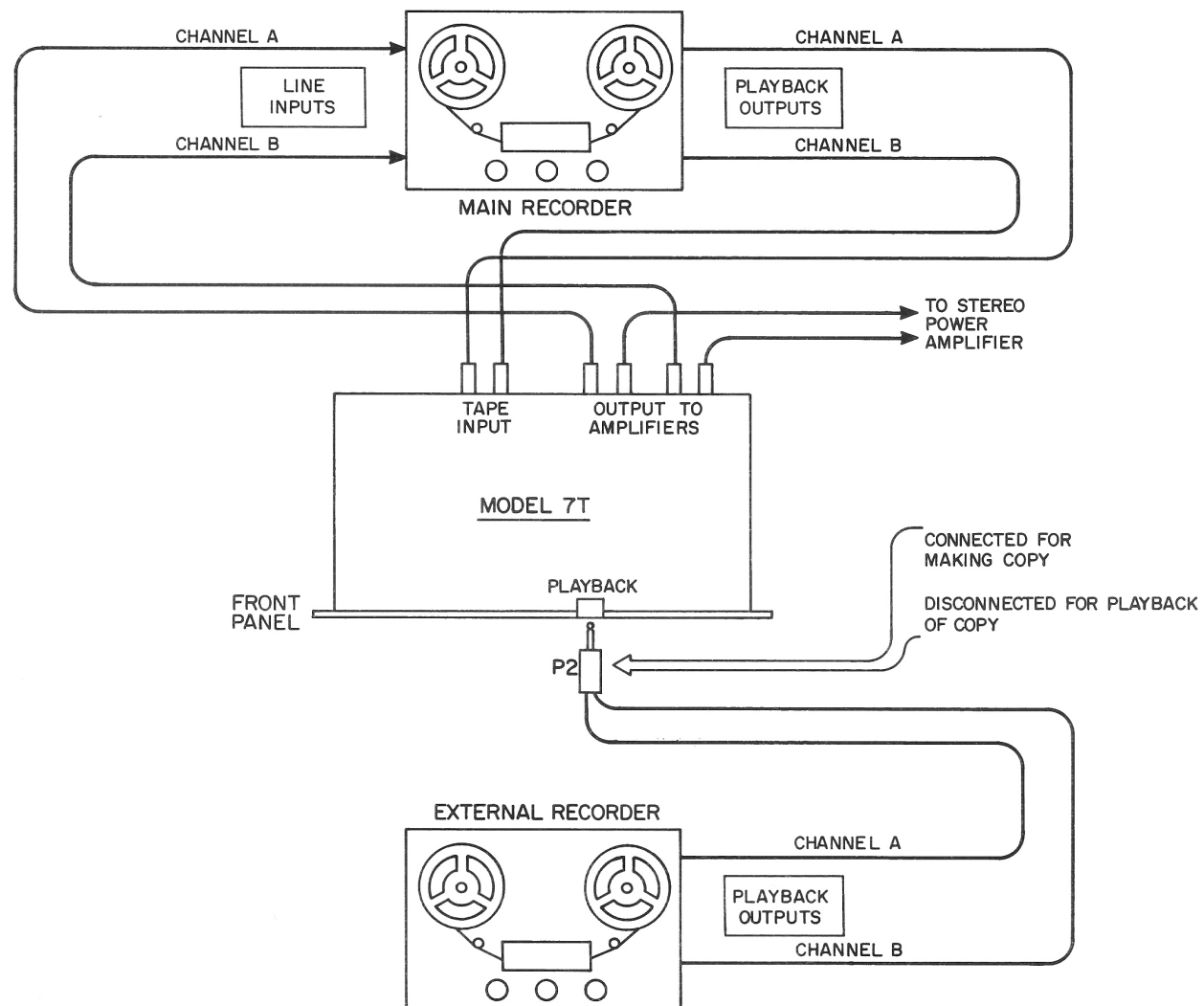


Figure 5. Equipment Arrangement for Making Improved Tape Copies

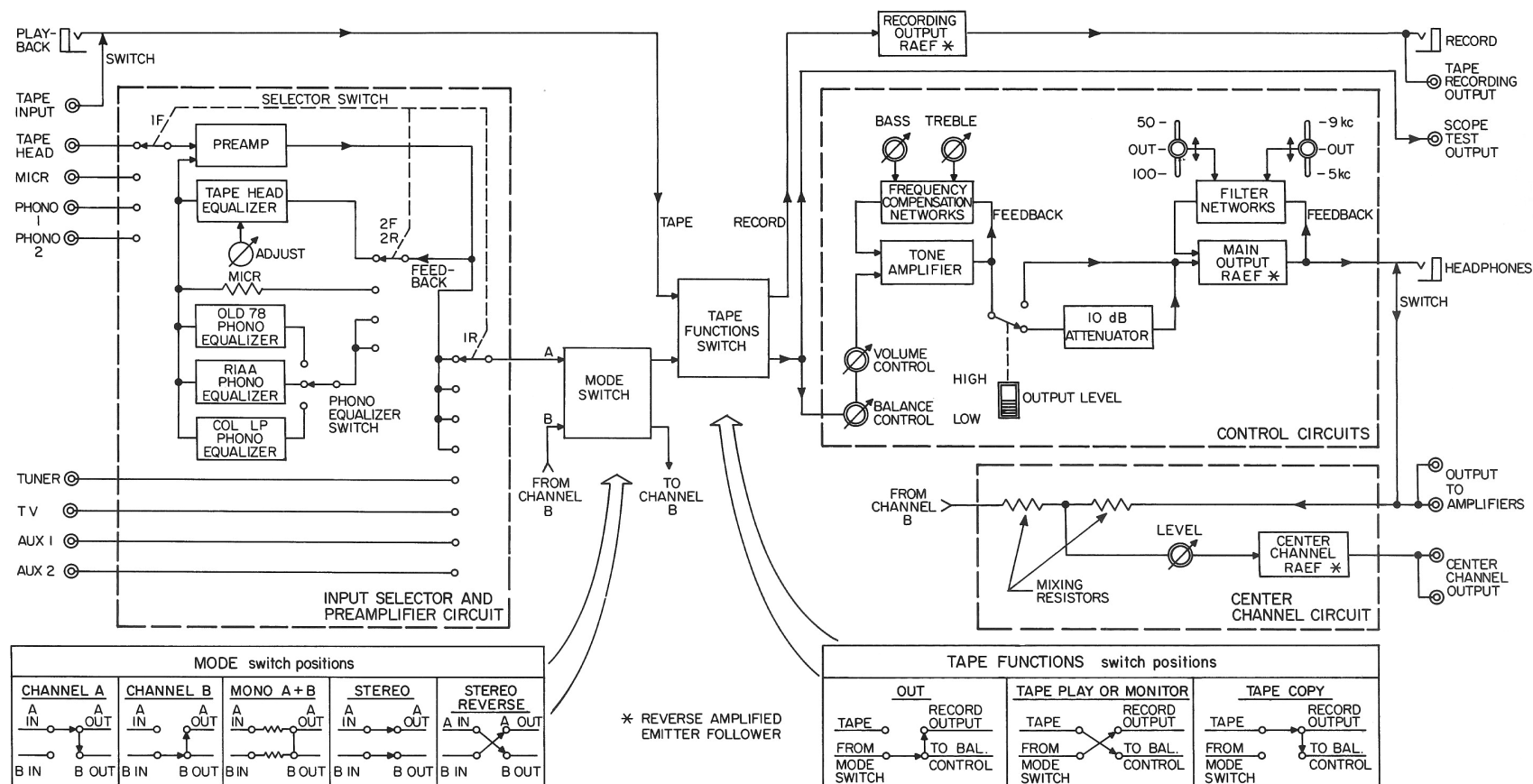


Figure 6. Functional System Diagram

## TECHNICAL DESCRIPTION

### GENERAL

Figure 7 is a simplified block diagram of the 7T stereo console showing the principle func-

tional elements and input and output signal routing. All inputs except the tape input (rear panel) and playback input (front panel) pass through the input selector and pre-amplifier circuit, which processes both channels A and B simultaneously. The A and B

signals from this circuit are then controlled by the five-position **mode** switch and fed to the **TAPE FUNCTIONS** switch. This switch is the central switching point of the 7T. It selects the signals from the **mode** switch and/or the tape inputs and feeds them to the

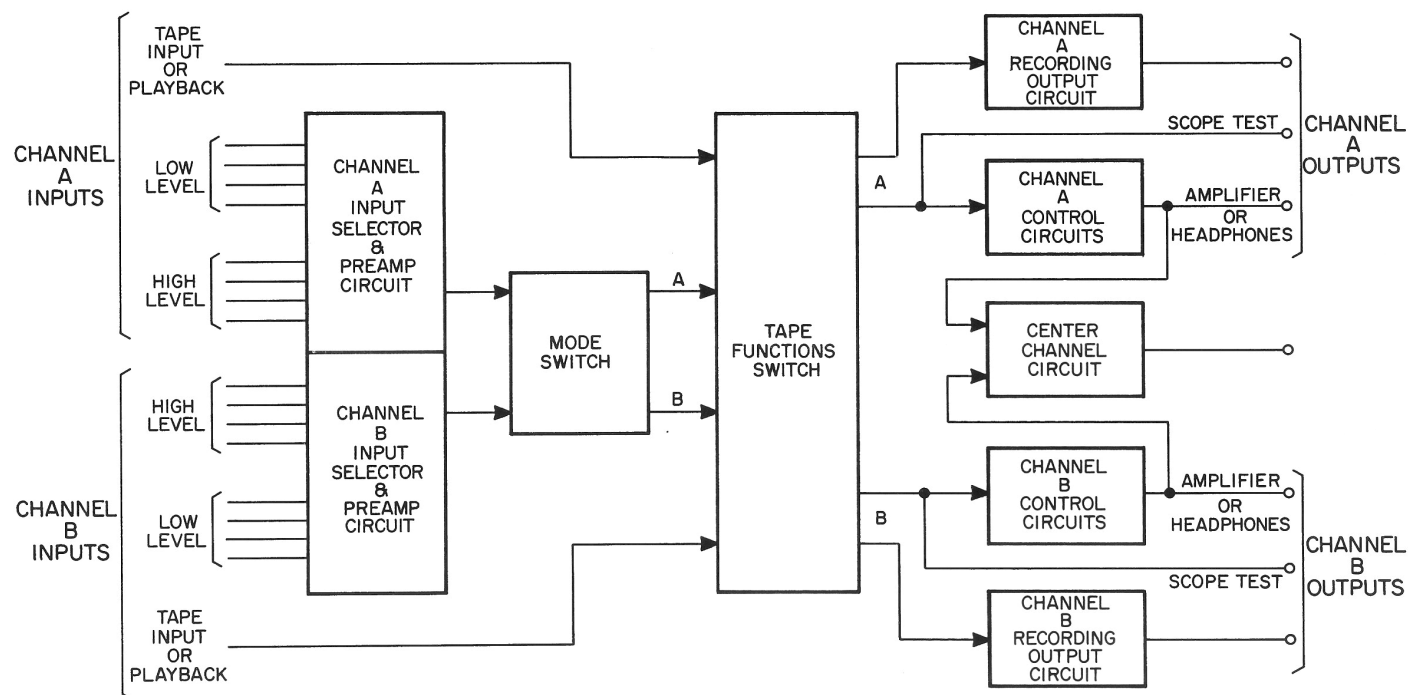


Figure 7. Simplified Block Diagram

channel A and B control circuits (balance, volume, tone, and filter controls, etc.) and/or the recording output circuits. Signals fed to the control circuits are always available at the **SCOPE TEST OUTPUT** jacks on the rear panel for technical evaluation. The channel A and B control circuit outputs are fed to the amplifier output jacks (rear panel) or to the **HEADPHONES** jack on the front panel. When the control circuit outputs are fed to the amplifier output jacks, they are also fed

to the center channel circuit, which samples and mixes them in equal proportions to form a derived  $A+B$  center channel monophonic signal, which is fed to the **CENTER CHANNEL OUTPUT** jacks.

### FUNCTIONAL DESCRIPTION

Figure 6 is a simplified functional diagram which shows in detail the signal processing circuits of the 7T stereo console. For clarity, this diagram shows channel A only; channel

B is identical. Two parts of channel A are common to channel B. These are the **mode** switch and the center channel circuit. All controls except the **bass** and **treble** tone controls and the center channel **LEVEL** control are ganged to their counterparts in channel B. Only the channel A half of the front panel **RECORD, PLAYBACK**, and **HEADPHONES** jacks are shown in this diagram. The channel B half of each jack is wired to the same circuit point in the B channel.

### Input selector and preamplifier circuit

— The function of this circuit is to feed the low-level selected input signal to the preamplifier, apply the required feedback equalization, and route high-level signals directly to the **mode** switch. Section 1F of the **selector** switch feeds one of the four low-level input sources to the high-gain preamplifier. Sections 2F and 2R (simplified in this diagram) of the switch connect the appropriate equalizer network into the feedback loop. Each of these networks provides precise equalization for the corresponding input source.

In the **MICROPHONE** position, the equalizer network is a single resistor. This sets the preamplifier gain to 40 dB and the frequency response flat,  $\pm 0.1$  dB from 20 to 20,000 Hz. In the **PHONO 1** and **PHONO 2** positions, the particular equalizer network is determined by the setting of the **PHONO EQUALIZER** switch. Each one of these networks sets the preamplifier gain (at 1,000 Hz.) to 42 dB. The frequency response of the preamplifier depends on the particular network selected, as shown in Figure 8. In the **TAPE-HEAD** position, a variable equalizer is switched into the feedback loop. The variable element is the **TAPE EQU. ADJUST** potentiometer on the rear panel. This network sets the preamplifier gain to 42 dB (at 500 Hz.) At frequencies below 500 Hz., the frequency response is fixed, as shown in Figure 8. At frequencies above 500 Hz., the response is variable, over a range of 13.5 dB at 10,000 Hz. In Figure 8, the 0 dB reference for the equalization curves corresponds to a preamplifier gain of 42 dB.

Section 1R of the **selector** switch routes the equalized output of the preamplifier, or one

of the four high-level inputs to the **mode** switch. Identical circuits in channel B of the 7T employ sections 3F, 3R, 2F, and 2R of the **selector** switch.

**Mode switch** Channel switching is controlled by the **mode** switch. Signal routing for each of the five positions of this switch is shown at the bottom of Figure 6.

**Tape Functions switch** The **TAPE FUNCTIONS** switch controls the routing of the selected input signal and/or the tape input signal (for both channels) to the control circuits and/or the recording output circuit. As shown at the bottom of Figure 6, in the **OUT** (normal) position, the selected signal from the input selector and preamplifier circuit is fed to both the control circuits and the

recording output circuit. This position is intended for listening to a program source while recording it.

In the **TAPE PLAY or monitor** position, the selected input signal is fed only to the recording output circuit, while the tape input signal is fed to the control circuits. This position is intended for listening to recorded tapes or for monitoring the "results" of a tape recording as it is in progress.

In the **TAPE COPY** position, the selected input signal is not processed. The tape input signal is fed to both the control circuits and the recording output circuit. This position is intended for listening to a recorded tape from one tape machine, while making a copy of the tape on a second machine.

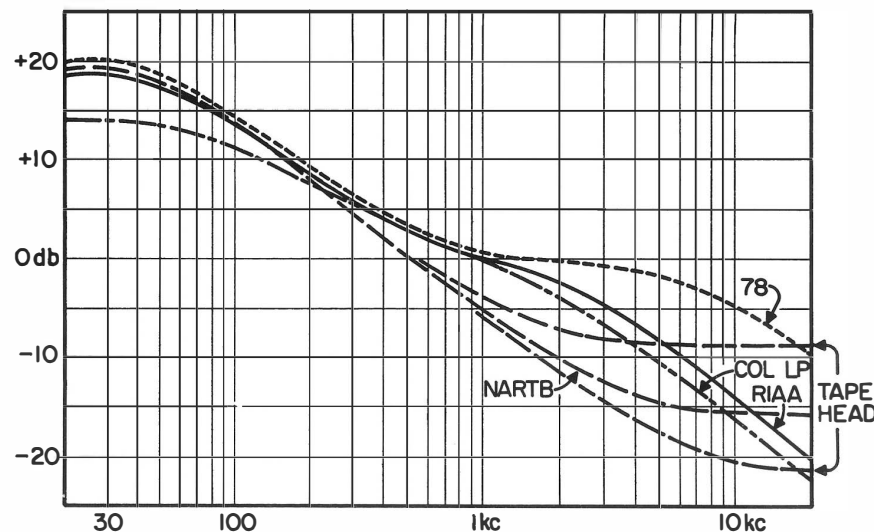


Figure 8. Phono and Tape Equalization Characteristics

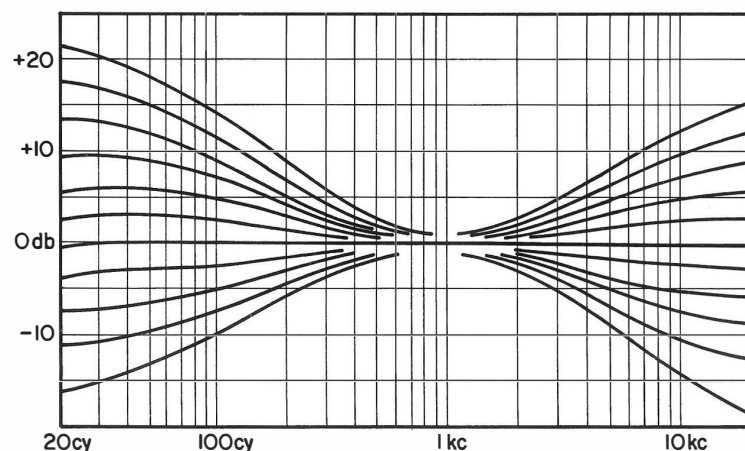


Figure 9. Tone Control Characteristics

**Tape Input Facilities** The **PLAYBACK** jack on the front panel is a 3-conductor stereo jack. It has two built-in switches, one for each channel. Normally the switch is closed, allowing the tape input signal from the **TAPE INPUT** jack on the rear panel to be fed to the **TAPE FUNCTIONS** switch. When a plug is inserted in the **PLAYBACK** jack, the switches are opened, disconnecting the **TAPE INPUT** jacks and allowing the signal from the **PLAYBACK** jack to reach the **TAPE FUNCTIONS** switch. Thus only one tape recorder at a time can feed playback signals into the 7T.

**Tape Output Facilities** The **TAPE RECORDING OUTPUT** jacks on the rear panel and the **RECORD** 3-conductor stereo jack on the front panel are wired in parallel, to permit feeding recording signals to two tape machines simultaneously. These output facilities are driven by the recording output cir-

cuit, which is a reverse-amplified emitter-follower having unity gain, i.e., it provides an output voltage equal to its input voltage. Thus, for example, with the **TAPE FUNCTIONS** switch in the **TAPE COPY** position, a  $\frac{1}{2}$ -volt signal fed into the **TAPE INPUT** or **PLAYBACK** jack produces a  $\frac{1}{2}$ -volt signal at the **TAPE RECORDING OUTPUT** or **RECORD** jack. The **volume** control has no effect on this signal.

**Control Circuits** The control circuits portion of the 7T consist of the **balance**, **volume**, **bass**, **treble**, **OUTPUT LEVEL**, **LOW-FREQ FILTER**, and **HIGH-FREQ FILTER** controls. With the exception of the **bass** and **treble** controls, each of these controls affects both A and B channels simultaneously.

Signals from the **TAPE FUNCTIONS** switch are adjusted for relative and overall level by

the **balance** and **volume** controls respectively. The **balance** control is a full-range control which permits attenuation of either channel to complete cutoff. In the center position, attenuation is approximately 3 dB. The change of attenuation in each channel, as the control is turned away from center, has been designed to maintain total apparent loudness from both channels. This feature makes it a true stereo balance control. The **volume** control attenuates both channels simultaneously and maintains tracking to within 2 dB at any point of attenuation to -65 dB from maximum. Since the control is situated at the input of the tone amplifier, there is no possibility of overloading the amplifier stages under maximum rated output conditions. Thus, distortion is kept to a minimum.

After attenuation by the **balance** and **volume** controls, the channel A signal is applied to the high-gain tone amplifier. The **bass** and **treble** controls are 11-position switches. In each position, a precision frequency-compensation network is connected into the feedback loop from the output to the input of the amplifier. In the center (straight up) position of the controls, the feedback sets the gain to 21.5 dB (balance control centered) and the frequency response flat from 20 to 20,000 Hz. In other positions, the compensation networks alter the overall frequency response, but maintain the 1,000 Hz gain at 21.5 dB. Each position of the **bass** control changes the gain at 50 Hz, 3 dB. Each position of the **treble** control changes the gain at 10,000 Hz,  $2\frac{1}{2}$  dB. The frequency response curves for each switch position are shown in Figure 9. The 0 dB reference level corresponds to a gain of 21.5 dB.



The **OUTPUT LEVEL** switch on the rear panel provides an optional 10-dB attenuation in both channels. In certain situations such as use of very high gain power amplifiers and/or very efficient loudspeakers, it may be desirable to switch in the 10 dB attenuation to optimize the signal-to-noise ratio for the complete system. It should be remembered that this attenuation also affects the levels of both channels at the **HEADPHONES** jack.

The main output RAEF (reverse-amplified emitter follower) has unity gain (0 dB) over the entire audio band when the **LOW-FREQ FILTER** and **HIGH-FREQ FILTER** switches are in the **OUT** positions. When one of these switches is in a cut position, a filter network is switched into the feedback loop to attenuate the frequency response of the circuit at a rate of 12 dB/octave. These networks provide a true double time-constant transfer function characterized by a sharp cutoff (3 dB down at the cutoff frequency). The cutoff frequency is as marked on the front panel. Figure 10 shows the frequency response curves resulting from use of the two filters.

**Output Facilities** Signals from the main output RAEF's are normally fed to the **OUTPUT TO AMPLIFIERS** jacks through the switches built into the 3-conductor stereo **HEADPHONES** jack. Inserting a plug into this jack disconnects the output jacks and allows the signals to feed the headphones (or any other device you might wish to use). The output of the RAEF is specified as 10 volts rms maximum. Impedance is low enough to drive 600-ohm headphones without distortion. Even lower impedance headphones may be

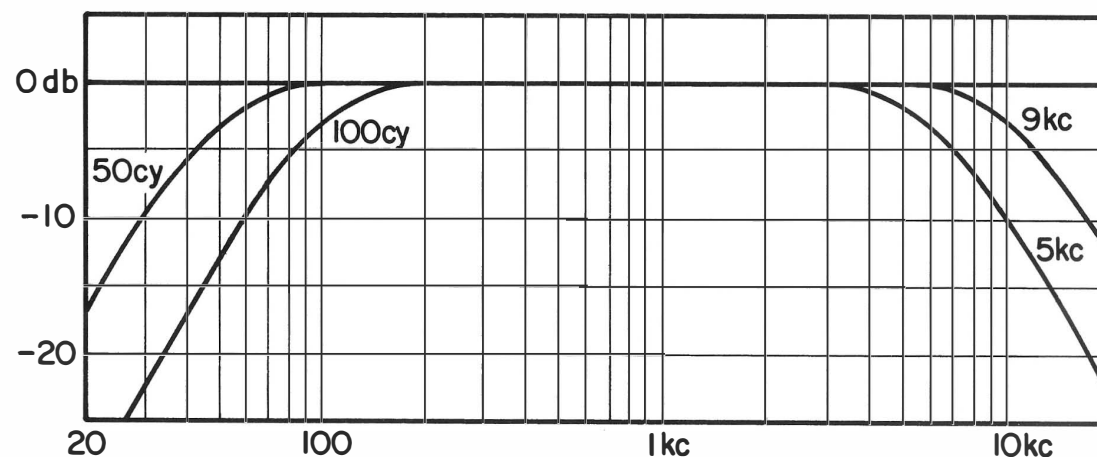


Figure 10. Low-frequency and High-frequency Filter Characteristics

used, but the power may not be sufficient to produce very loud sounds. Of special significance is the fact that even a short circuit will not damage the circuits of the 7T.

**Center Channel Circuit** Two resistors sample the output of the A and B channels and feed the mixture through the **LEVEL** control to the center channel RAEF. The gain of this circuit is approximately 8 dB, making it possible to operate the center channel at a louder level than the main channels. For example, if the output level in both the A and B channels is 0.4 volt, the output level of the center channel (with the **LEVEL** control turned up all the way) would be 1.0 volt. If only one channel is being used (**balance** control turned to one limit), the center channel output level would be 2 dB greater, or 0.5

volt. Notice that the switches in the **HEADPHONES** jack also disconnect the center channel output when a plug is inserted.

## HOW TO INTERPRET THE TEST RESULTS

Packed with your 7T stereo console is the Performance Documentation card which was filled out by Marantz test personnel and inspectors. These measurements are your assurance that the 7T meets or exceeds its rated specifications.

The gain of the A and B channels is measured first, from one of the high level inputs to the main output, with the **balance** control turned fully clockwise or counterclockwise, and the **volume** control turned fully clockwise. This gain measures 24.5 dB. Next, the **balance**

control is electrically and mechanically centered, to yield equal gain in each channel. The value is  $21.5 \pm 0.8$  dB. This means that the **balance** control has an attenuation of approximately  $3.0 \pm 0.5$  dB when centered. The equal gain value is written on the card.

The overall gain is measured by feeding the test signal into the **MICRO**phone input jacks through a precision 40-dB attenuator. Since the preamplifier gain for microphone input is specified as  $40.0 \pm 0.2$  dB, the measured output voltage should be the same as that measured for the high-level input. The overall gain figure written on the card represents the addition of the 40-dB low-level gain plus the previously measured high-level gain (**balance** control at clockwise or counter-clockwise limit). The phono input gain at 1,000 Hz. is 2 dB greater than the microphone gain.

Intermodulation distortion is measured for

both channels at the main output jacks with the IM test signal fed first to the **MICRO**phone jacks, then to one pair of high-level input jacks. The distortion is measured at 10 volts rms equivalent peak output, i.e., the level of the IM test signal is set so that the peak amplitude of its complex waveform at the output jack is the same (14.14 volts) as the peak amplitude of a 10-volt rms sine-wave signal. The distortion percentages are written on the card.

Low-level noise is measured by inserting the shorting plugs into the phono input jacks, to prevent amplifying input noise. The **balance** control is turned to one of its limits and the **volume** control is turned fully clockwise. The noise at the output jacks is then measured through an audio-band filter by a precision a-c voltmeter. The value written on the card is the actual meter reading. It represents the

input noise multiplied by the channel gain.

Assume, for example, that your unit has an overall gain measuring 64.6 dB. Adding the 2 dB gain for the phono input yields a total gain of 66.6 dB, which is a multiplication factor of 2,139. Dividing this factor into the measured output noise of 2.0 millivolts yields 0.935 microvolt, which is satisfactorily below the specified 1 microvolt level.

High-level noise is measured by turning the **volume** control fully counterclockwise to short the tone amplifier input. Assuming, for example that the measured output noise is 30 microvolts, the equivalent noise input can be found by dividing the measured value by the ratio corresponding to the high-level gain. The gain is 24.5 dB which is a multiplication factor of 16.99. Dividing this factor into 30 microvolts yields 1.79 microvolts which is satisfactorily below the specified 2 microvolts.

## TECHNICAL SPECIFICATIONS

Gain—Microphone input to main output .....	61.5 ± 1.0dB*
Phono input to main output .....	63.5 ± 1.0dB*
Tape-Head input to main output .....	63.5 ± 1.0dB*
Phono input to recording output .....	42.0 ± 0.2dB
Microphone input to recording output .....	40.0 ± 0.2dB
High level input to main output .....	21.5 ± 0.8dB*
* with balance control set to Normal position	
Frequency Response .....	± 0.5dB, 20 to 20,000 Hz.
IM Distortion .....	0.15% at 10 volts rms equivalent peak output
Total Harmonic Distortion—1 volt @ 2kHz .....	non-measurable
5 volts @ 2kHz .....	0.02%
10 volts @ 2kHz .....	0.03%
Dynamic Range (phono input to recording output at 1 kHz and at rated distortion) .....	100dB, typical
Total Noise .....	1 micro volt equivalent input
Input Impedance—Phono 1 and Phono 2 .....	47K ohms
Microphone and Tape-Head .....	approximately 450K
High level .....	approximately 200K
Equalization, tone control and filter characteristics .....	As shown in Figures 7, 8 and 9
Power requirements .....	105 to 130 volts, rms 50 to 60 Hz 9 watts
Dimensions—Panel Width .....	15¾ inches
Panel Height .....	5¾ inches
Depth behind panel .....	8 inches
Clearance for panel and knobs .....	7⁄8 inch
Weight—Unit alone .....	9 pounds
Packed for shipment .....	11 pounds

Specifications subject to change without notice.

## CUSTOM INSTALLATION

To install the 7T stereo console in a custom cabinet, simply cut out an opening  $14\frac{7}{16}$  inches wide by  $5\frac{7}{16}$  inches high. Since the front panel of the 7T is wider than the cut-out, it will neatly hide the edges of the cut. Because the unit weighs only 9 pounds, it can be supported entirely by its front panel. Fasten in place with the four #4 oval-head screws (packed in the Parts Kit envelope).

### NOTE

Please do not use the holes in the corners of the front panel as drill guides. A slip can ruin the appearance of the panel.

The unit can be mounted either vertically or horizontally, and, because power dissipation is only 9 watts, can be completely enclosed.

### CAUTION

Do not totally enclose the 7T with any other heat-producing components of your system.

We suggest that you allow convenient access for adjusting the **CENTER CHANNEL OUTPUT LEVEL** control and the **OUTPUT LEVEL** switch, at least until the complete system is installed and checked out.

When planning the installation, arrange associated components so that power transformers or motors are kept away from the 7T, to prevent inductive hum pickup.

## SERVICE NOTES

Since the 7T stereo console is completely solid state, replacement of parts should never be required. If the pilot light burns out, however, have your serviceman replace it with the spare lamp packed in the Parts Kit envelope. The lamp plugs into a socket-bracket which is clipped onto the rear side of the front panel. The lamp is shrouded by a white plastic sleeve which should not be discarded.

### FUSE

The model 7T is protected by a  $\frac{1}{8}$ -amp, slow-blow fuse. In the event the fuse blows out, replace **ONLY** with the same type and rating. Replacement with a fuse of higher rating will not protect the instrument and will void the warranty.

### KNOBS

The round knobs on the front panel are held to their shafts by Allen-head setscrews. An

Allen wrench has been included in the Parts Kit envelope for use in removing or tightening these knobs. Each lever switch knob is secured by built-in spring action.

### CLEANING

Your 7T stereo console has a very durable finish. The front panel and knobs are gold anodized for lasting beauty. You can clean the panel and knobs with a mild detergent and water solution applied with a soft cloth or cotton swab. Never use scouring powder or any strong abrasive cleaner.

### REPAIRS

Only the most competent and qualified service technicians should be allowed to service the 7T stereo console. The Marantz Company and its factory-trained warranty station personnel have the knowledge and special equipment needed for repair and calibration of this precision instrument.

In the event of difficulty, write directly to the factory for the name and address of the Marantz warranty or authorized service station nearest your home or business. Please include the model and serial number of your unit together with a description of what you feel is abnormal about its behavior.



**marantz.**

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